Table 5-1. Libby OU3 Phase IIC Ecological Sampling Program Elements

	Program Element	Receptors	Description	Field Sampling Locations	Field Samples	Laboratory Analyses Required
1	Site-Specific Sediment Toxicity Testing	Benthic Invertebrates	Sediments collected and toxicity testing conducted with two organisms in 42 day exposures.	Fleetwood Creek (FC-1; FC-2) Upper Rainy Creek (URC-1; URC-2) Lower Rainy Creek (LRC-1, LRC-3, LRC-5, LRC-6) Carney Creek (CC-1)	Grab samples of sediment	Asbestos, TAL metals, Toxicity testing
2	Population and Community Demographics	Benthic Invertebrates	Benthic invertebrates collected, enumerated and species identified. Metrics calculated according to EPA RBP and Biological Condition Score calculated for each sampling location and compared to reference.	Upper Rainy Creek (URC-1; URC-2) Lower Rainy Creek (LRC-1 to LC-6) Fleetwood Creek (FC-1; FC-2) Carney Creek (CC-1; CC-2)	1) Composite samples collected according to EPA RBP[1]. 2) Three surber samples collected for comparison to Forest Service Data[2]	Benthic Invertebrate Identification and enumeration
		Fish	Fish collected and species identified and enumerated and size recorded. Sub sample of fish	Upper Rainy Creek (URC-1; URC-2) Lower Rainy Creek (LRC-1 to LC-6) Fleetwood Creek (FC-1; FC-2) Carney Creek (CC-1; CC-2)	Smaller fish species where identification is questionable.	Confirmation of field species identifications, where necessary.
		Small Mammals	Small mammals will be colleeted over a five day trapping period. The species and number of individuals captured will be recorded.	Site 1: On-Site Site 2: Nearby Forested Area ~~Site 3: Riparian Area~~ Site 4: Reference	None	None
		Birds	Birds will be collected from each of four areas over a five day sampling period. The species and number of individuals captured will be recorded.	Site 1: On-Site Site 2: Nearby Forested Area ~~Site 3: Riparian Area~~ Site 4: Reference	None	None
3	In-Situ Measures of Exposure and Effect	Fish	A subsample of the fish collected will be sacrificed. A gross necropsy will be performed with specific tissues dissected in the field and preserved for histopathology and asbestos tissue residue analyses.	Upper Rainy Creek (URC-1; URC-2) Lower Rainy Creek (LRC-1 to LC-6) Fleetwood Creek (FC-1; FC-2) Carney Creek (CC-1; CC-2)	1) Tissues for histopathology 2) Tissues for asbestos residue	Held
		Small Mammals	A subsample of the small mammals collected will be sacrificed. A gross necropsy will be performed with specific tissues dissected in the field and preserved for histopathology and asbestos tissue residue analyses.	Site 1: On-Site Site 2: Nearby Forested Area Site 3: Riparian Area Site 4: Reference	1) Tissues for histopathology 2) Tissues for asbestos residue	Histopathology Asbestos Residue
		Birds	A subsample of the birds collected will be sacrificed. A gross necropsy will be performed with specific tissues dissected in the field and preserved for histopathology and asbestos tissue residue analyses.	Site 1: On-Site Site 2: Nearby Forested Area Site 3: Riparian Area Site 4: Reference	1) Tissues for histopathology 2) Tissues for asbestos residue	Histopathology Asbestos Residue

Table 5-2
Libby OU3 Phase IIC - Rainy Creek Watershed Ecological Sampling Summary

Station ID		Station Description	Asbestos in Sediment [1] $MF_{LA\%}$ fine	Chromium in Sediment [1] mg/kg	Phase IIA SW/SD Data [2]	Surface Water Toxicity Testing [2]	Sediment Toxicity Testing	Benthic Invert. Community	Fish Population Demographics	Fish Histopath/ Asbestos Tissue Burden
Rainy Creek	URC-1	Upper Rainy Creek above Mine Area	ND	6	√		√	√	√	H
	URC-1A	Upper Rainy Creek above Mine Area 100 yards north of Rainy Creek Rd	NS	NS	√					
	URC-2	Upper Rainy Creek above Mine Area	<1%	32.8	√			√	√	H
	LRC-1	Lower Rainy Creek above confluence with Carney Creek	<1%	148	√		√	√	√	H
	LRC-2	Lower Rainy Creek below confluence with Carney Creek	<1%	135	√			√	√	H
	LRC-3	Lower Rainy Creek	2%	233	√		√	√	√	H
	LRC-4	Lower Rainy Creek	<1%	38.8	√			√	√	H
	LRC-5	Lower Rainy Creek	<1%	129	√		√	√	√	H
	LRC-6	Lower Rainy Creek just above confluence with the Kootenai River	<1%	126	√		√	√	√	H
Fleetwood Creek	FC-1	Fleetwood Creek above Mine Area	ND	14.6	√			√	√	H
	FC-2	Fleetwood Creek above Tailings Impoundment	Tr	21	√		√	√	√	H
	FC-Pond	Pond on Fleetwood Creek	<1%	289	√		√			
Tailings Impoundment	TP	Tailings Impoundment	<1%	110	√	√				
	UTP	Upper Tailings Impoundment	NS	NS	√					
	TP-TOE1	Toe drain of impoundment	2%	43	√					
	TP-TOE2	Toe drain flow to Rainy Creek below diversion	3%	213	√					
	TP-Overflow	In the overflow ditch from tailings impoundment	NS	NS	√					

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Station ID		Station Description	Asbestos in Sediment [1] $MF_{LA\%}$ fine	Chromium in Sediment [1] mg/kg	Phase IIA SW/SD Data [2]	Surface Water Toxicity Testing [2]	Sediment Toxicity Testing	Benthic Invert. Community	Fish Population Demographics	Fish Histopath/ Asbestos Tissue Burden
Mill Pond	MP	Mill Pond	<1%	48	√					
Carney Creek	CC-1	Carney Creek	4%	77.2	√		√	√	√	H
	CC-2	Carney Creek just above confluence with Rainy Creek	<1%	43.3	√			√	√	H
	CC-Pond	Pond on lower Carney Creek	NS	NS	√					
Reference		Reference Location	NS	NS			√	√	√	H

[1] Data are from the Phase I Sampling and Analyses.
[2] Proposed in Phase IIA Sampling and Analyses Plan (SAP) (USEPA, 2008b)
MF = millions of fibers
LA = Libby amphibole
H = Samples will be collected and preserved and held for possible later histopathological examination.

COMMENTS ON TABLE 5-1

Bonnie
As far as our conversation with Remedium next week I have tried to provide some thoughts on where we could cut or simplify for this first year. I don't think this needs to be reflected in the tables necessarily but more for negotiation purposes.

Looking at the plan and the LOE I don't think this is outrageous by any means. Here are my thoughts on personnel requirements. This would be the Cadillac if it were a site we were sampling and weren't required to wear a respirator.

Aquatic

Fish shocking: 4-5 people for 4-5 days.

Other: 2-3 people 3-4 days

Terrestrial

Small Mammal: 1-3 teams of 2 depending on number and proximity of stations. Days will have fair amount of down time if they bait the traps in the evening and run them in the morning.

Birds: Not real certain here but I would expect approximately the same as above.

Processing station: 2-3 people for shuttling, dissection, preservation, labeling, logging and shipping of samples

Element 1 – Sediment Toxicity Testing → Phasing this Tox > DL?.

I was under the impression that we were going to use three species. Also, I am unclear where the 42 days came from. The longest test I recall be discussed was a 28 day Chironomid emergence test. This element could be phased to see if there is toxicity in an area of high LA concentration. Pick a hot spot, establish whether there is toxicity or not, before looking at the potential spatial distribution of effects. This would be most easily accomplished with sampling in one of the ponds, although the ecological relevance may be questioned.

Element 2 – Demographics

Benthics- Methodology-Presumably this is the same protocol that we developed last Fall to be consistent with the USFS.

Small Mammals- Where did the 5 day trap period come from? I think we would want to target a sufficient number of animals and species of particular guilds (mostly for element 3) rather than an arbitrary time frame. What expert has provided guidance here? No need to sample riparian this first round - it should be dropped to a second tier priority. The nearby forest should be an area of High potential exposure (based on Duff). This will necessitate 2

reference areas – 1) adjacent to disturbed to serve as a reference to on-site and 2) a forested reference. This could be simplified with just one station of exposure and one reference station if MWH needs a break.

Birds- Same comments as for Small Mammals.

Element 3 – Demographics

Small Mammals- Animals will need to aged. Also, the same comments provided for element 2, regarding stations and sampling time, apply here.

Birds- Animals will need to aged. Also, the same comments provided for element 2, regarding stations and sampling time, apply here.

COMMENTS ON TABLE 5-2

I would rather not go into the exact stations too much at this point…other than comments above I think they look fine for now. Should the "H" footnote also include holding for asbestos analysis?